



## SERIES TWELVE

- |   |      |
|---|------|
| SDKFZ 232(FU) 8 Rad.                        | (GE) |
| Light Tank M 3 A1 "Stuart" III and IV       | (US) |
| Australian Cruiser Mk. 1 "Sentinal"         | (A)  |
| Opel Vehicles on the 3 ton Lorry Chassis :- |      |
| Semitrack "Maultier" SdKfz 4, SdKfz 305 and |      |
| Standard 4x2 Truck.                         | (GE) |



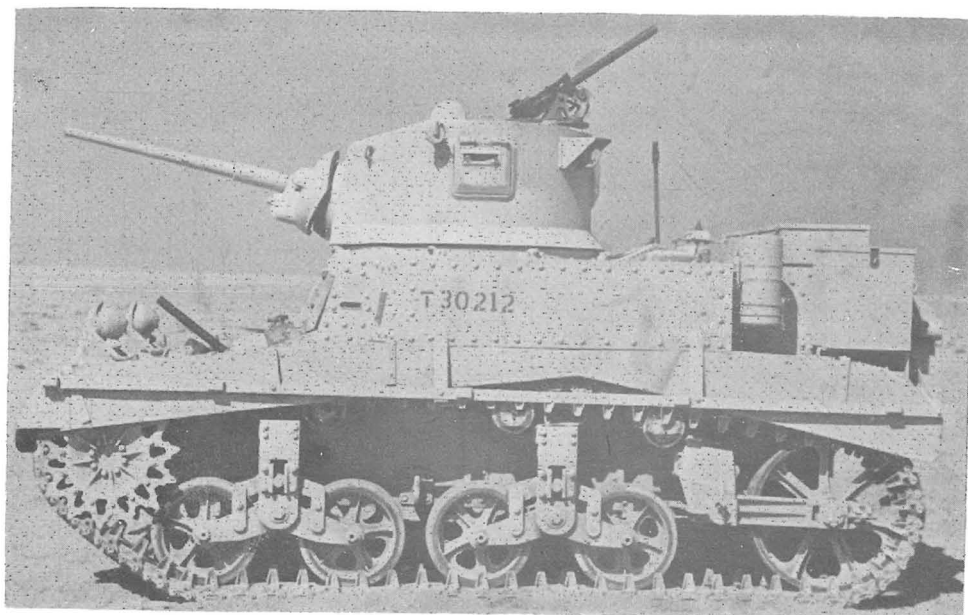
**MILITARY VEHICLE PRINTS**

15p  
BELLONA  
30p

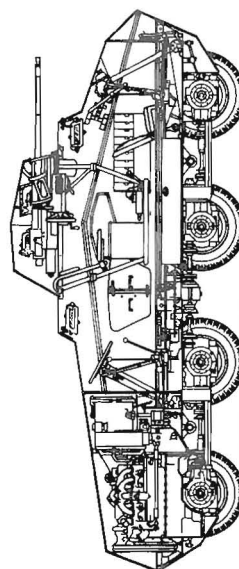
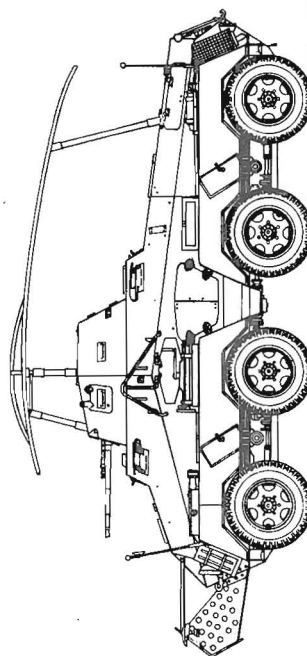
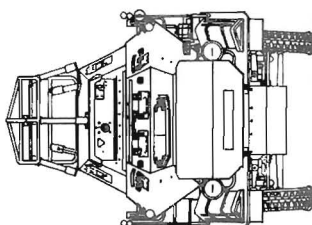
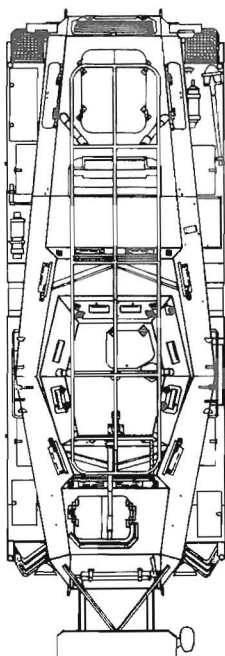
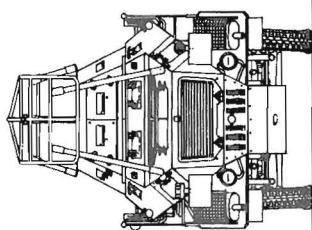


A late production Sd.Kfz. 231 8 rad. of the 7th. Panzer Division. The position of the aerial on the turret was the same for all Sd.Kfz. 231 cars from 1937. The large pole aerial on the right hand side appeared after the Sd.Kfz. 232 (Fu) with its cumbersome antenna was cancelled. Compare the vision slots and tail cover to the vehicle in the drawing. In all there were 1,235 vehicles of this series produced.  
(WARPICS PHOTO)

**COVER ILLUSTRATION:** This is one of the early Schwerer Panzerspähwagen (Sd.Kfz. 232) (Fu) 8 rad similar to that in the scale drawing. However this vehicle has not been fitted with the "Pakschutz" additional armour, which only appeared later. It is shown in the colours on vehicles used for the Polish campaign in 1939. The basic colour is the dark blue grey that had been standard from 1935. The large white "Balken Kreuz" were adopted as the Panzer identification markings for this first operation of "Blitzkrieg" so as to minimise on the possibility of German units been mistaken, especially by the Luftwaffe pilots, as the enemy. Various other markings show it to belong to the signal unit of a Motorized Infantry Regiment. The number plate and "totenkopf" (Death's head) prove this to be one of the Waffen SS brigades involved in the invasion of Poland.



British Army "General Stuart 11" (Honey) in sand coloured desert camouflage.



Schwerer Panzerspahwagen (Sd Kfz 232) (Fu) (8-Rad).  
Scale 1:76 (4 mm to 1 foot) Drawn by H. L. Doyle.

SCHWERE PANZERSPAHNSWAGEN AUF 8-RAD EINHEITSTYPEN

HISTORICAL RESEARCH BY W.J. SPIELBERGER.

The need for motorized reconnaissance units agreed upon in the late 1930's established the demand for procurement of modern armoured reconnaissance vehicles. Available at that time were only a limited number of armoured troop carriers allowed under the Treaty of Versailles. They proved to be useless for their intended purpose. To fill the immediate need, commercial 6 x 4 chassis equipped with armoured bodies (Daimler-Benz and Buessing-NAG) were used. Their cross-country ability, however, was severely restricted and improved vehicles had to be created. These were to be based upon the experience gained with the multi-wheel-vehicles (Wielradwagen) developed in secrecy from 1926 to 1929 (Daimler-Benz and Magirus eight-wheel, Buessing-NAG ten-wheel vehicles). These possessed ample cross-country performance and adequate speed ranges when street-bound.

The original objections that vehicles of this nature were too costly to produce, considering the economical conditions in Germany at that time, was overruled in 1932, especially in view of the urgency connected with the procurement of such vehicles. An annual production quota of 18 units was established.

In the meantime, the production of the 6 x 4 armoured cars based upon commercial chassis was stepped up, but these were to be replaced by the new 8 x 8 version as soon as possible. After discussions with the Ordnance Department, production readiness was to be obtained between 1935 and 1936, provided enough funds were made available.

In 1933, development work started, based upon previous experience, and the additional know-how gained in the development of the so-called "Einheitstypen". A new chassis, the Achtradrwagen (Vs.Kfz 623) was the result. Called type "G5" by its manufacturer, Buessing-NAG of Leipzig-Wahren, the development of this 8 x 8 chassis was concluded between 1934 and 1935. The vehicle had independent wheel suspension, was equipped with eight-wheel drive, and eight-wheel steering. On the rear end of a very sturdy conventional frame, a Buessing eight-cylinder V type gasoline engine, type L8V, was installed, while dual steering mechanism for forward and reverse driving at full speed completed this special chassis. Chassis weight amounted to 4120 kg. Originally the engine had an output of 150 HP, allowing a top speed of 51 m.p.h. (82 km). Fighting weight of the vehicle was 8.5 t. Deutsche Werke AG in Kiel was responsible for the development of the armoured vehicle, while assembly also took place at the plant of F. Schichau in Elbing. These vehicles were representative of the heavy standard equipment for German armoured reconnaissance units until the end of World War II. Officially issued to the troops were the following versions:

- a. Schwerer Panzerspahwagen (Sd.Kfz. 231)(8-Rad)
- b. Schwerer Panzerspahwagen (Sd.Kfz. 232)(Fu)(8-Rad)
- c. Heavy armoured reconnaissance car (Sd.Kfz. 232)(Radio)(8-wheeled) (Subject of this Bellona print)
- d. Schwerer Panzerspahwagen (7.5cm)(Sd.Kfz. 233)
- e. Panzerfunkwagen (Sd.Kfz. 263)(8-Rad)

The basic armour of these vehicles was between 10 and 14.5 mm, both the Sd.Kfz. 231 and 232 were externally identical except for their radio antennae. Armament consisted of a 2 cm KwK 30 and an MG34 in a 360 degree traverse turret. The commander sat on the left of the turret and gunner to the right from where he operated the steering wheel type traverse gear. Elevation was by push pull control on the same unit. There were two independent hydraulic firing systems for the MG allowing it to be fired either along with the 2 cm or on its own.

Both vehicles had a four man crew. The first production batch of these vehicles was completed in February 1940 and the Sd Kfz 232 was only produced until May 1940. A second series was commenced in the fall of that year.

The drawing represents an early model which has been fitted with the so-called "Pakschutz" bolted to the front of some vehicles during the war to provide additional armour protection. Late production models of the first series incorporated improved vision ports and some even the external gun mantel. Adequate protection was achieved for the radiator by replacing the grill with an armoured duct. Wading facilities were improved so that up to 3'3 3/4" (100 cm) could be negotiated.

The performance of the L8V engine was increased to 180 HP by enlarging the bore and when this improved engine was fitted a road speed of nearly 62 M.P.H. (100 KM.P.H.) Later vehicles, such as shown in our photograph had all these improvements and in addition the final production models had a redesigned frontal armour 30 mm plates incorporated in layout which was later adopted for the Sd.Kfz. 234 series. The 2cm KwK 30 now replaced the KwK 30.

The Sd Kfz.233 consisted of a converted vehicle with the turret removed and a 7.5cm KwK L/24 mounted in the front plate. This version served from late 1941 as a close support vehicle. The Sd.Kfz. 263 Radio vehicle had a heightened fighting compartment that formed a rigid turret. The armament consisted of only one MG 34. This vehicle, however, had a five man crew and was exclusively assembled by the Deutsche Werke in Kiel. Production ceased in January 1942. The production capacity released by the abandonment of the Sd.Kfz. 232 and 263 models was taken up with the m.SPW Sd.Kfz. 251 semi-track personnel vehicle (Bellona Series 2, No 7g) Production of all other eight wheel standard units was stopped during the year of 1942, while production of the L8V engine continued until 1944. In 1943 the tasks of the eight wheeled Einheitstypen was taken over by the new Sd.Kfz 234 series.

Technical specification for Schwerer Panzerspahwagen (Sd.Kfz. 232) (Fu) 8-rad.

(Vehicle shown in drawing)

Weight: laden: 8.2 tons, 8.5 tonne.  
Crew: 4

Performance

Speed Max. Road: 51 m.p.h. (82 KmPh)  
Cross country: 19m m.p.h. (31)

Max. gradient: 27 degrees  
Trench: 4'-2" (124 cm)  
Step: 1'-7" (49)  
Fording: 2'0" (61)  
Turning Circle 37'-5" (11.4 metres)  
Range: 186/106 miles (200/170 Km)  
Fuel capacity internal: Main tank  
24 gals. (108 litres)  
Auxiliary tank: 6 gals. (30 litres)

Dimensions

Length overall: 21'-6" (652 cm)  
Length of hull: 19'-0 1/2" (580)  
Width: 7'-3" (220)  
Height inc. antenna: 9'-0 1/2" (290)  
Height: 7'-10" (238)  
Ground clearance: 11" (28)  
Wheel track: 5'-4 1/2" (161)  
Wheel base: 13'-5 1/2" (410)  
Bogie Base: 4'-5" (135)  
Bogie Centres: 9'-0 1/2" (275)  
Wheel size: 210 mm x 18"

Mechanical Details

Engine: Buessing NAG "L8V" 7.91 litre  
8 cyl 90 degree V-type,  
Petrol 081 developing 155  
bhp at 3000 r.p.m.  
6 forward and reverse  
(3 speed box, with high/low ratio, reversible)

Suspension: Inverted semi-elliptical leaf springs.

Brakes: Mechanical

Armament

1 x 2 cm KwK 30 with 180 Rds in 10 Rd. Mags.

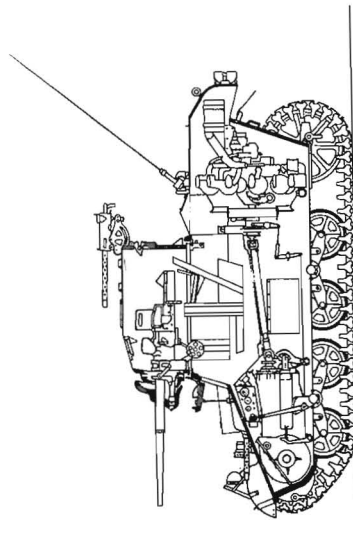
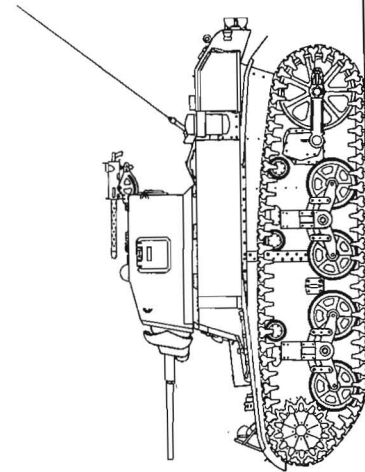
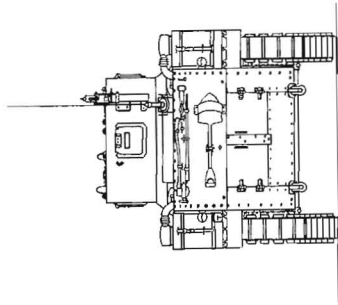
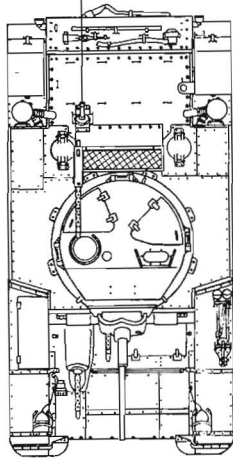
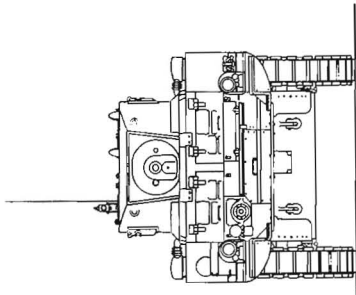
1 x 7.92 mm MG34 coaxial, with  
1.125 Rds in 75 Rd. Mags.

Elevation: plus 26, minus 10 degrees.

1 x 9 mm MP 38 with 192 Rds.

Armour

Mantel: 15 mm  
Front plates: 14.5 mm  
Hull sides: 8 mm  
Hull top & Belly: 5 mm  
Engine sides and rear: 10 mm  
Turret sides: 8 mm  
Turret top: 5 mm



Light Tank M3A1 "General Stuart" III and IV  
Scale 1:76 (4 mm to 1 foot) Drawn by D. P. Dyer.

LIGHT TANK M3AI GENERAL STUART 111 and IV (1942)

The development of the American M.3 series of light tanks can be traced through preceeding models back to the British Vickers Armstrong Six Ton Tank of 1928 as an original concept.

Out of the many tens of thousands of tanks produced in the U.S.A. during the second World War, the Stuart was the first to see action. Eighty four were included in the first deliveries of arms to the Middle East under Lend Lease in July 1941. By the time of 'Operation Crusader' to drive Rommel back from Tobruk in November 1941 various contingents of the British 4th Armoured Brigade had been equipped with 163 of them. These were used to replace the A9s, A10s, and A13s, many of which had been abandoned due to mechanical failure during the abortive Greek campaign, or lost during the Axis thrust to regain Cyrenaica.

A story goes that after a unit had been issued with their first Stuarts and had put them through their paces (during the course of which they tried everything that would have thrown the tracks of a British Tank) a driver was asked what he thought of his new mount. "It's a Honey" he replied. The term stuck, and from then on became the name by which they were affectionately known.

Whilst being classed as a light tank by the Americans it's weight was comparable to early British "Cruiser" Tanks. Comparison to the 'Heavy Cruiser' Mk VI crusader 1 which weighed 50% more, shows the Stuart to be evenly matched, although this only held true when the Crusader was fitted with the 2 pdr. Armour thickness was somewhat similar, speed was greater, and the 37mm of the Stuart was a better anti-tank gun than the 2pdr as well as having the advantage of being able to fire H.E. and Canister shells.

Many writers have derided the 37mm M6 as a similar 'pea shooter' to the 2pdr, but both of these guns were superior in Armour to piercing qualities to both the 5cm L/42 fitted to the Pz. Kpfw 111 up to mid 1942, and the 7.5cm L/24 which were mounted in the Pz. Kpfw IV until the introduction of the KwK 40 also in 1942, and these were the German Medium and Heavy Tanks of the period.

When the Pz. Kpfw 111 first appeared in North Africa with the D. A. K. many British Cruiser tanks had a maximum armour thickness of only 16mm which could be pierced by the 5cm fitted to the Pz. Kpfw 111 at ranges exceeding 2,000 yds. The Pz. Kpfw 111 and IV at this same period had a maximum armour thickness of 30mm which required a 2pdr armed tank to close to 1,000 yards to obtain penetration. The 37mm of the Stuart however could penetrate the 30mm armour of the Germans at ranges up to 2,000 yards, and as it's frontal armour thickness of 38mm was effective against the 5cm L/42 at anything over 750 yards, and the 7.5cm L/24 at ranges over 500 yards the position for a short while was reversed completely.

What it took the British and Commonwealth troops so long to realise after Rommel came on the scene, and during the introduction of the Crusader, Stuart, and Grant, and continued use of the Matilda, was that it wasn't the German tanks which took such a toll of their tanks but the Anti-tank guns. These anti-tank guns the Germans either moved forward with their tanks, or used from ambush positions with their tanks as decoys. Had the British developed an Armour piercing shell for the 3.7" A/A gun sooner, this weapon could have been used in a similar capacity to the German Eighty Eight and the outcome of many desert battles might have been a lot different.

It can therefore be concluded that when the M.3 Stuart 1 and 11 first appeared in action in 1941 they were one of the most effective tanks of any type in the desert. However, due to the Germans promptly increasing the fire power and armour protection of their tanks this advantage was quickly lost and they reverted to what they were originally designed as, namely reliable, reasonably well armed and armoured fast light tanks.

Whilst being basically similar, the main external difference between late production Light Tanks M3 and the M3AI was the absence of a cupola. Removal of this cupola resulted in a lower silhouette and helped counteract the 'Tail in the saddle' description which so aptly described the earlier model. Other modifications included power traverse for the turret enabling a turret basket to be fitted. The gun was fitted with a stabiliser in elevation to increase accuracy whilst firing when in motion, and the sponson mounted .30 cal m.g.s. were removed.

Production of the M3AI commenced in June 1942 overlapping the final few months production of the M3 which was produced by the same manufacturer, The American Car and Foundry Co. Before a change over to production of it's successor the M3A3 in January 1943 a total of 4,621 had been produced including 211 with Diesel engines known as Stuart IV.

An American Light tank M3AI with all rivetted construction is available in the Bellona Colour Sheet Series.

Technical specification for Light Tank M3AI "Stuart III"

Crew: 4  
Weight: 28,515 lbs (12.7 long tons,  
14.3 short tons, 12.5 tonnes)

Performance

Speed: Max Road 36 mph (58 kmph)  
Max Gradient: 26°  
Fording Depth: 42" (101cm)  
Trench Crossing: 6' (183cm)  
Turning Radius: 21' (6.4 metres)  
Step: 24" (61cm)  
Range: 60 miles (96km)  
Fuel Capacity: 50 gals imperial (56 gals U.S., 227 litres)

Dimensions

Length overall including shovel: 14'10" (452 cm)  
Width: 7'6" (229cm)  
Height to turret top: 7'4" (223cm)  
Ground Clearance: 1'3" (38cm)  
Track on Ground: 9'7" (290cm)  
Track Width: 11½" (29 cm)  
No. of links: 66

Mechanical Details

Engine: 1 x Continental model W670-9A Petrol,  
7 cylinder air cooled radial 250 hp at  
2,400 rpm  
Gearbox: Synchromesh 5 forward 1 reverse  
Steering: Controlled differential

Suspension: Vertical volute spring. Two double  
wheel bogies each side and three return  
rollers. Trailing Idler.

Armament

1 x 37mm gun M6, L/57 stabilised in elevation  
mounted in 360° power traverse turret.  
3 x .30 cal m.g.s (bow, co-axial, and A/A)

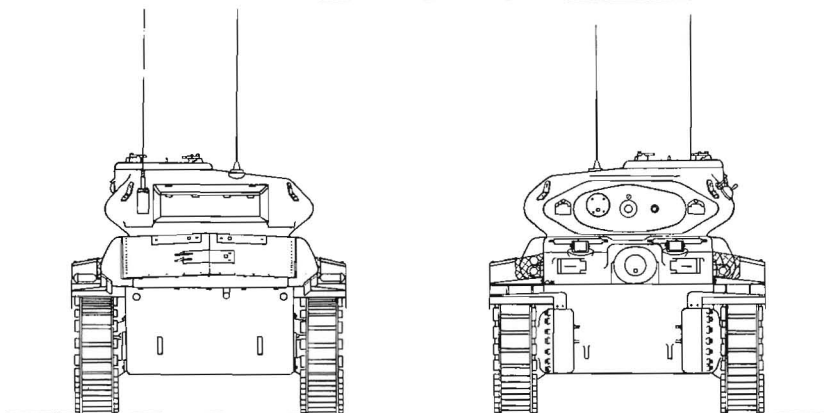
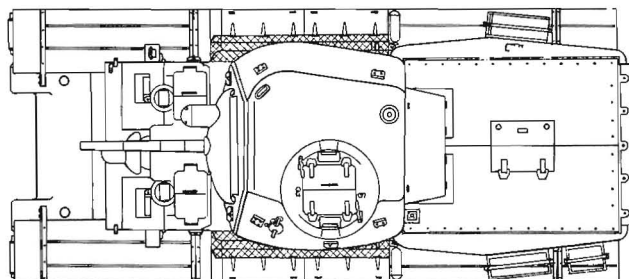
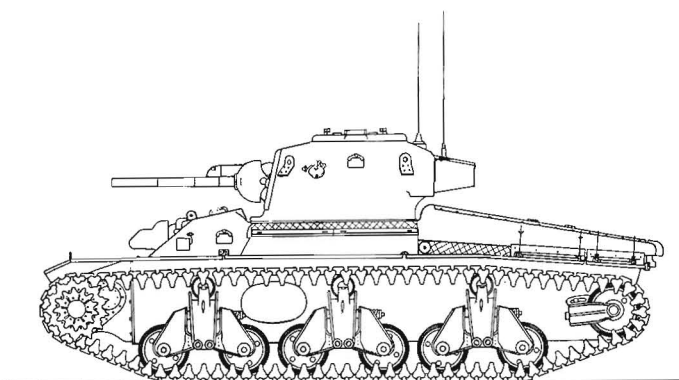
Ammunition Stowage

111 rounds 37mm  
7,000 rounds .30 cal

Armour - Rolled Plate except where mentioned

Lower Front: Cast 2" (51mm) at 20° to 90°  
Upper nose: ½" (13mm) at 68°  
Drivers Front: 1½" (38mm)  
Sides: 1" (25mm) at 0°  
Deck: 3/8" (10mm) at 90°  
Floor: 3/8" and ½" (10mm and 12mm) at 90°  
Rear: Upper ½" (13mm) at 0° to 60°  
Rear: Lower 1" (25mm) at 13°  
Turret Front: 2" (51mm) at 10°  
Turret Sides and rear: 1½" (38mm) at 0°  
Turret Top: 3/8" (10mm) at 75 and 90°





Australian Cruiser Mark 1 "Sentinel"  
 Scale 1:76 (4 mm to 1 foot) Drawn by D. P. Dyer.

AUSTRALIAN CRUISER mark 1 'SENTINEL'

Due to British tank production capacity being completely absorbed in producing vehicles to resist the expected German invasion after the fall of France in June 1940, and through American Tank production being nearly non-existent at this period, it was decided by the Australians that the only way in which they could obtain tanks would be to manufacture them themselves. The need for tanks was imperative, both for home defence and to equip their forces in the Middle East.

In view of Australia being mainly an agricultural country without even an automobile industry, it is little wonder that whilst the necessity of producing their own tank was obvious, the possibility of ever doing so was continually in doubt. Anyone studying the evolution of the Australian Cruiser cannot help but be impressed by the 'insurmountable' problems that had to be overcome in this project. It was not just a case of designing a tank and placing the orders, but of ascertaining facilities and possibilities and tailoring the design to suit these very limited facilities. The original plan to produce 2,000 16/20 Ton tanks with production commencing in July 1941 at the rate of 70 a month was therefore fantastically optimistic.

The design which eventually evolved as a pilot model in January 1942 was, despite compromises, innovations, and improvisations, a very creditable vehicle. Except for the engines which were assembled from parts imported from the U.S.A. and various small items such as bearings (where these couldn't be replaced by 'solid' bearings) and tracks, these tanks were manufactured completely in Australia from Australian resources.

Out of the many innovations the greatest was the casting of the complete hull in one piece. The power unit was composed of three Cadillac engines joined together in a 'clover leaf' design, and the transmission whilst being based on the American designs for their M.3 Medium, was greatly simplified.

During the period from conception to the first production vehicle coming off the assembly line in August 1942, America had commenced on her massive tank production program and in fact the 1st Australian Armoured Division had already been equipped with Grants and Stuarts. The AC.1 was being built at a steadily increasing rate however and it was not until July 1943 that a cessation of production was ordered. By this time sufficient American tanks had arrived in Australia to equip three divisions and it was decided that the labour required to carry on producing Australian tanks could be utilised to a better advantage.

A total of 66 AC.1 were delivered to the Army but were never used operationally, being used for training purposes under the name Sentinel, until they were declared obsolete in 1946.

The AC.11 was a proposal for a lighter tank to be built, utilising heavy lorry components to be supplied by America. An order for 400 sets was placed in June 1941 but subsequently cancelled.

Whilst the turret ring diameter of the AC.1 was fairly early on agreed at 54" to allow for fitting the Australian produced 6pdr, these were always in too short a supply. Not to be deterred, and realising the necessity of fitting a larger gun than the 2pdr, the AC.11 incorporated a redesigned hull and turret with a turret ring diameter of 64", enabling them to mount the Australian 25 pdr. The bow Vickers water cooled m.g. and gunner were to be obviated thereby allowing more storage space for the larger ammunition. A prototype was tested in February 1943 which favourably impressed all observers, and it was decided that production of the scheduled 66 AC.1s was to be followed immediately by this later model. As production of Australian tanks was halted soon after this however, it is not thought that any production models of the AC.11 appeared.

Following tests with two 25pdrs mounted together in a turret and fired simultaneously it was decided that the tank was capable of withstanding the heavy recoil loads of a 17pdr, and a prototype of the AC.IV mounting this gun was produced, which would have been a first class vehicle.

Technical Specification for Australian Cruiser Mark 1

Crew: 5  
Weight laden: 62,720 lbs (28 tons, 31.4 short tons,  
27.5 tonnes)

Performance

Speed: Max Road 30 mph (48 kmph)  
Fording Depth: 48" (122cm)  
Trench Crossing: 9'6" (290cm)  
Range: 200 miles (322km)  
Grade: 35° (7%)  
Obstacle: 24" (61cm)

Dimensions

Length: 21' (640cm)  
Width: 9'1" (277cm)  
Height: 8'5" (256cm)  
Ground clearance: 15½" (39cm)  
Track Width: 16" (40cm)

Mechanical Details

Engine: 3 x Cadillac V8 Liquid Cooled Petrol rated at  
117hp each.  
Gearbox: Crash type 5F - IR  
Steering: Controlled Differential

Suspension: Horizontal Volute Spring, three bogies of two  
wheels each side of Hitchkiss type. Three  
return rollers each side.

Armament

1 x 2pdr (40mm) L/52 in electrically rotated turret  
with 360° traverse.  
1 x .303" Vickers Water Cooled m.g. co-axial  
1 x .303" Vickers Water Cooled m.g. flexible in bow mount  
1 x .303" Bren m.g. A/A 1 x Thompson submachine gun

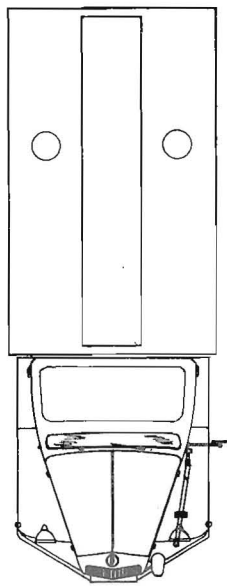
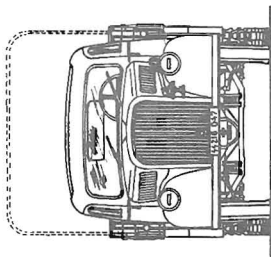
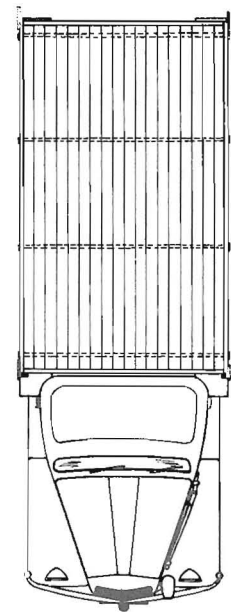
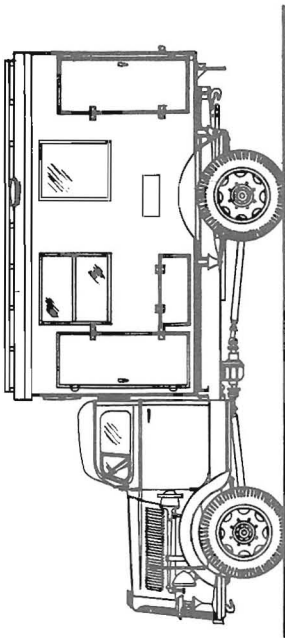
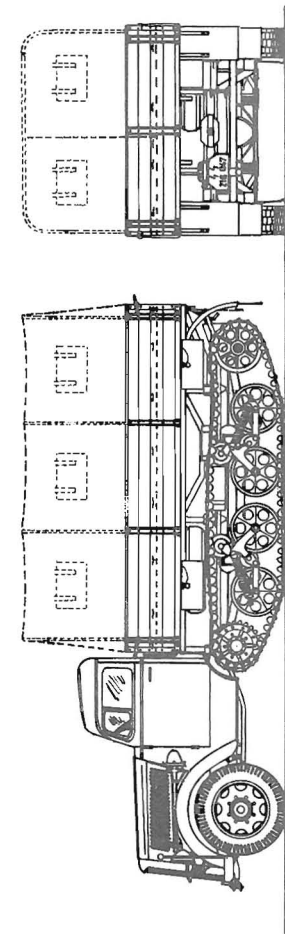
Ammunition Stowage

130 rounds 2pdr  
4250 rounds .303" in belts for Vickers m.g.s  
900 rounds .303" for Bren m.g.  
300 rounds .45" for Thompson S.M.G.  
12 Signal Flares, 6 Hand Grenades.

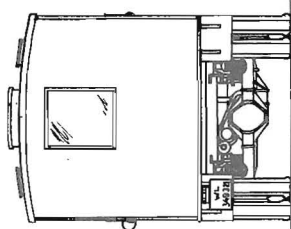
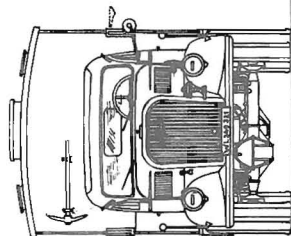
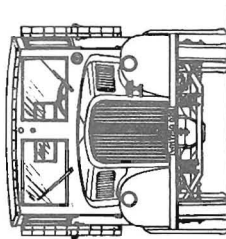
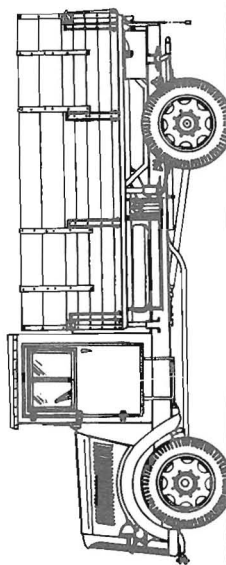
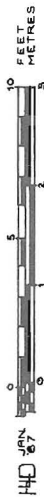
Armour

Hull front 2½" (63mm)  
Hull sides and rear 1½" (44mm)  
Hull top front 7/8" (22mm)  
Hull floors 5/8" (16mm)  
Turret front sides and rear 2½" (63mm), Roof 1" (25mm)





Gleisketten-LKW 2t offen. "Maultier" Opel, Sd. Kfz. 4.



OPEL VEHICLES WITHIN THE STANDARD 3 TON TRUCK CLASS - 1937 - 49

HISTORICAL RESEARCH BY W.J. SPIELBERGER

A new motorization programme called the "Schell Program", established in 1938, suggested that certain types of automobiles to be used for both military and civilian purposes.

Within the framework of this programme, the Army abandoned the development of special purpose vehicle designs, such as the former 6 x 4 and 6 x 6 (Einheitsdiesel) developments, and agreed to be content with some reliable basic types which would provide simple but adequate transport vehicles.

The basis for these "universal" series of trucks, having load classes of 1.5, 3, 4.5, and 6.5 tons of payload was formed by a regular 4 x 2 standard type (S type). A similar vehicle equipped with four-wheel drive (A type) would be produced mainly for military purposes. Minor deviations were incorporated to allow for the need of specialized vehicles such as buses and ambulances.

The following manufacturers embarked upon the production of 3 ton load carrier vehicles.

Adam Opel AG, Werk Brandenburg, Daimler-Benz AG, Werke, Mannheim and Gaggenau; Kloeckner-Humbolt-Deutz Werk, Magirus - Ulm; Ford Werke AG, Koeln; C.F.W. Borgward of Bremen.

One of the most numerous built during the War were those produced by Opel, a subsidiary of General Motors. The basic Opel 4 x 2 vehicle (S type) - was based on very conventional design principals. This was the type S 3.6 - 36, which was built from 1937 to 1945. Only a five-speed gear box was provided, so cross-country performance was rather restricted. Nevertheless, this vehicle saw extensive service in most theatres and proved to be quite reliable. Opel showed a production planning for 1945 of 17,990 vehicles of this type.

During 1944, Daimler-Benz ceased to produce the type S/A 3000, their 3 ton load carrier, and started to build the Opel vehicle under license. This vehicle was designated "L 701." Their production target was to manufacture during 1945 22,400 S.type units. The official designation of the flat bed truck was "m. LKW, 3t offen (o)", (o) standing for standard commercial vehicle. Manufacturer and type was normally added to complete the nomenclature.

Its counterpart, the 4 x 4 A type, carried the official designation m. LKW, 3 ton. (A Typ) and was in its technical layout almost identical to the type 3.6-36 S. The Opel designation was 3.6-6700, Typ A, or Blitz 3t. It had, a 6" (15cm) shorter wheel base and a two speed transfer that allowed for a total of ten forward and two reverse gears. Thus, it had a substantially improved cross-country performance.

Long wheel base versions (15'3"-14.65 cm) were usually fitted with bus bodies. This "Wehrmachts-Omnibus" was really a multi-purpose vehicle providing 26 seats as a bus, but accommodating up to 23 wounded personnel if used as an ambulance. Since all interior fittings could be removed easily, it also served as a command centre.

During adverse weather periods, especially on the Russian front, even the A type vehicles proved to be inadequate in their ability to supply front line units. In order to secure these supplies, a large number of standard truck were ordered to be built as semi-track vehicles. The tracked suspension unit developed for this purpose, by the Waifen-SS, was based upon a Carden-Lloyd idea, and utilized the track of the PzKw 1 and II. The conversion needed few basic changes, the rear axle was moved forward, the drive train shortened and the frame reinforced. The original brake drums were retained for track steering and two levers to operate them were added to the controls. Official nomenclature for converted vehicles was "Gleisketten-LKW 2t, Maultier Sd. Kfz 4). The increase in overall weight because of the new suspension, decreased the payload rating of these vehicles to 2 tons.

The 3 ton (S type) trucks, built by Opel, KHD, and Ford were used for these conversions. Most were done in occupied France. 1,000 of these units were built at the French Ford Factory in Asnieres.

Available to the German Army on August 1, 1943, were 5,403 Maultier vehicles. The production was phased out by June 1, 1943, with the new design of the sWS, taking over the functions of the Maultier and the Zgkw 5 ton. "Maultier" will be featured later in this series.

Many of these 3 ton vehicles both 4 x 2 and 4 x 4, were equipped with the box-like body, shown on the type A drawn. This so-called "Wehrmachts-Einheitskofferaufbau" served for a large variety of functions, at least 100 different versions are officially known, ranging from radio stations to delousing-vans. The standard Kfz designation for box-type body equipped vehicles was 305, regardless of the make of the chassis.

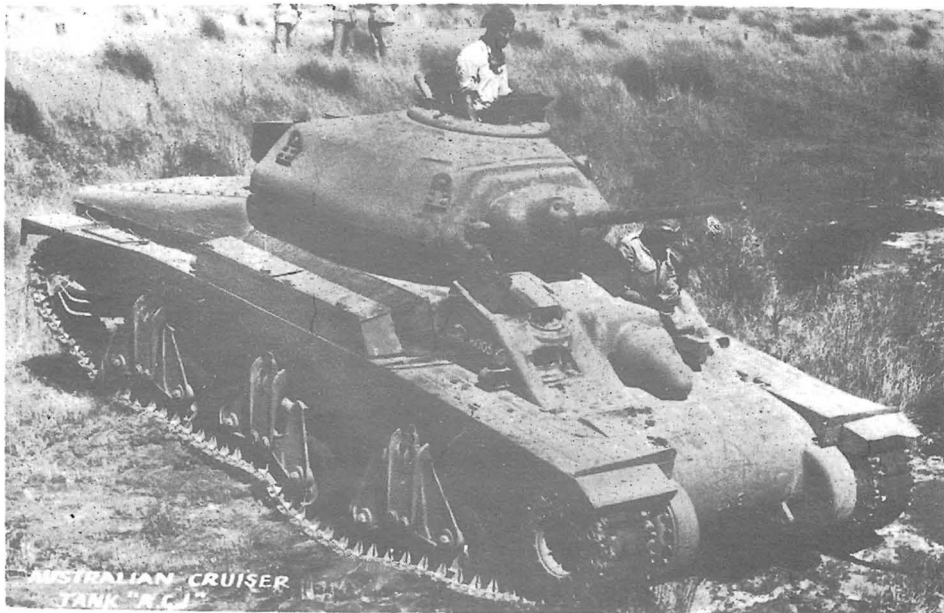
Few "Maultier" vehicles were similarly equipped and some of these served with V-2 rocket units. Also fire-fighting apparatus, tanker vehicles and other special body equipment were mounted on the standard 3 ton chassis.

1944 saw the replacement of the original steel cabs with the so-called "Wehrmachts-Einheitsfahrerhaus." This "Ersatz" cab as shown on the drawing of the 3.6-36S was made of pressed cardboard and wood components and eliminated the need for costly metal cabs. It was the same size and style for all vehicles of the 1.5, 3, 4.5 and 6.5 ton classes. It was still in use on most post-war vehicles built in Germany up to 1947.

The vehicles of the 3 ton class provided the backbone for civilian transports in the immediate post-war years. Without changes, Ford continued to produce 3 ton trucks days after the occupation. Borgward, and KHD did the same somewhat later, since damage to their plants was more extensive. Daimler-Benz built the Opel vehicles until 1949, since Opel factory in Brandenburg was completely dismantled by the Russians.

Technical specification for m. LKW 3t Opel

	3.6-36 Typ S	3.6-6700 Typ A	3.6-36 Typ S/SSM
Crew (seats):	2/3	2/3	2/3
Weight, laden:	5.7 tons (5900)	6 tons (6100)	5.8 tons (5930)
Chassis weight:	1.75 tons (1800)	2 tons (2100)	3.7 tons (3800)
Trailer weight:	---	2 tons	3 tons
<b>PERFORMANCE</b>			
Road speed:	53 m. p. h. (85Km/h)	50 m. p. h. (80Km/h)	30 m. p. h. (38Km/h)
Max gradient:	19 degrees	35 degrees	24 degrees
Fording:	1'5 1/4" (44 cm)	1'7 1/4" (50)	1'5 1/4" (44)
Turning circle:	43'0" (13.1m)	50'9" (15.7)	48'3" (15)
Range: miles (Km):	250/230 (400/350)	230/122 (350/200)	106/62 (165/100)
Internal fuel cap:	20 gals (92 ltr.)	20 (92)	18 (82)

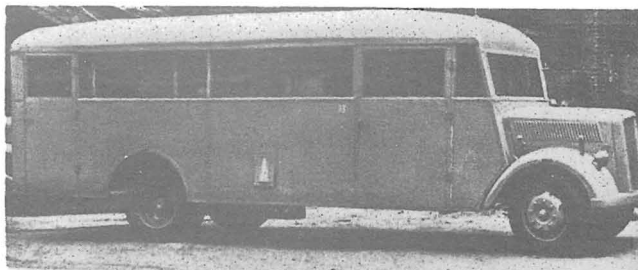


The Australian Cruiser Mark 1 "Sentinel" was a very fine tank when it is considered that Australia had never before attempted to build such heavy vehicles. The R. A. C. Tank Museum at Bovington, England has one of these "Sentinel" tanks on display.

(Photo courtesy of the Australian Tank Corps.)

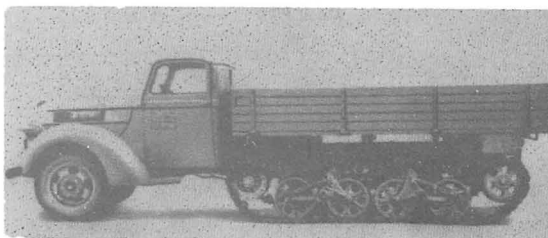


An Opel 36-6700 typ A with conventional flat truck bed and tilt. Note the rack for additional fuel can.



The 3.6-47 typ S was a long wheelbase version of the Opel chassis and was mainly used for this so-called Wehrmacht-Omnibus. This was a multipurpose vehicle as the interior fittings could be removed to convert it into an Ambulance or command centre.

A Ford "Haultier" which had the same suspension system as the Opel conversion.



#### Technical specification for m. LKW 3 ton Opel (continued)

##### MECHANICAL DETAILS

Engine:	3,626 cc. 6 cyl. inline, watercooled, petrol developing 75 bhp at 3200 rpm.		
Gearbox:	Opel 5 forward and 1 reverse (Two speed transfer box on typA only giving 10 F, 2 R.)		
Suspension:	Longitudinal leaf springs.		L. Leaf and Spiral
Electrical system:	Bosch 12 volt. One 50 amp/hr battery		
Tyre size:	190 x 20	190 x 20	190 x 20
Dimensions:	See drawings for details.		
Ground Clearance:	8 3/4" (22 cm)	9 3/4" (25)	10 1/4" (26.5)
Wheeltrack: front:	5'0 1/2" (154.2)	5'4" (163)	5'0 1/2" (154.2)
rear:	5'3 3/4" (162)	5'4 3/4" (164.2)	6'0 1/2" (178)
Wheelbase:	11'10" (360)	11'4" (345)	---

Note: Armoured versions of the Opel "Haultier" will be described in a later issue.

"GERMAN DECORATIONS WORN BY PERSONNEL OF PANZER, PANZER GRENADIER AND ARMoured UNITS,  
OR WITH SUPPORTING ARMS. 1936-1945 - PART I.

BY B. L. DAVIS

**INTRODUCTION:** German decorations, medals and awards issued immediately prior to and during the Second World War were an essential part of the German war effort. The 3rd Reich authorities were well aware of the importance to good fighting moral due the presentation of such awards.

As the war progressed new badges were designed and introduced and others were created to fill those gaps between such existing awards and the need to recognize those members of the German Armed Forces that had distinguished themselves in continuous, and in many cases extremely dangerous, armed engagements with the enemy.

The decorations featured are just a few of the more important of these awards.



**THE 1936 PANZER ASSAULT BADGE  
(1936 PANZERKAMPFABZEICHEN)**

Worn by those members of Colonel von Thoma's Panzer Korps which served in Spain during the Spanish Civil War. Authorised for wear by von Thoma towards the end of the 1936 the badge was confirmed as an official decoration by the German High Command on 10th July 1936. It was struck in silver only.

Worn on the left breast tunic pocket.

**PANZER ASSAULT BADGE. (PANZERKAMPFABZEICHEN)**

Class in Bronze Founded 1st June, 1940.

Awarded to Personnel of Panzer Grenadier Regiments, Panzer Aufklaerungs (Reconnaissance), Battalions and Panzerspachwagen units. Also to Medical personnel who went forward into action in tanks and attended the wounded in the fighting zone. Awarded for Three panzer assaults on three different days.

Worn on the lower part of the left breast tunic pocket.

Class in Silver Founded 20th December 1940.

Awarded to Officers and Men of Panzer Units for at least three engagements on three separate days.

Worn on the lower part of the left breast tunic pocket.

**NUMBERED PANZER ASSAULT BADGES. (DIE STUFEN ZUM PANZERABZEICHEN)**

Classes in Silver and Bronze: Each class numbered 25, 50, 75 & 100.

Founded after July 1943

Awarded to those personnel eligible for the two lower grades of the Panzer Assault Badge, for long and continuous front line combat service with Armoured Units. The figures 25, 50, 75 & 100 indicate the number of Panzer engagements completed by the recipient.

Worn on the lower part of the left-breast tunic pocket.



**THE TANK DESTRUCTION BADGE. (SONDERABZEICHEN FÜR  
DAS NIEDERKAEMPFFEN VON PANZERKAMPFWAGEN usw.  
DURCH EINZELKAEMPFER).**

Class in Silver Founded 9th March 1943.

Awarded to Soldiers (and in some cases Luftwaffe troops) who fulfilled the following: the single-handed destruction of an enemy tank or armoured vehicle in close combat, using only such weapons as an anti-tank rifle, grenades, pole charges etc. Each award represented one enemy tank destroyed and 4 such awards in silver could be awarded to any one man.

Worn on the upper left arm, one award worn directly below the other.

Class in Gold Founded January 1943.

Awarded to and for the same reasons as for the Silver class. The Gold badge representing a 5th enemy tank destroyed. Worn on the left upper arm of the tunic immediately above the four Silver badges.



The officer seen here indicating positions on the map is wearing the 1936 PANZER ASSAULT BADGE.



An SS-Oberscharfuehrer wearing the five TANK DESTRUCTION BADGES. (In the background a PzKw. "Tiger I").